BROAD AGENCY ANNOUNCEMENT (W91WAW-08-BAA-RACO)

U.S. ARMY RESEARCH INSTITUTE FOR BEHAVIORAL AND SOCIAL SCIENCES'S BASIC RESEARCH PROGRAM.

I. The Research and Advanced Concepts Office (RACO) of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) solicits new proposals for its fiscal year 2008 contract program of basic research in behavioral science. This Broad Agency Announcement is issued per FAR 35.016.

The basic research program supports behavioral research projects that are designed to expand fundamental knowledge and discover general principles. We encourage researchers to propose novel, state-of-the-art, and multidisciplinary approaches that address difficult problems, as well as programmatic efforts to develop and evaluate psychological & behavioral theory. A key consideration in the decision to support a research proposal is that its finding is likely to stimulate new, applied behavioral research leading to more effective behavioral technologies, and thereby improve the performance of Army personnel and their units. Proposals may address both traditional behavioral issues as well as neuroscience and network science approaches to social phenomena, memory, cognition, and personality. **The agency cannot support proposals that are primarily applied research projects (e.g., human factors studies or training program evaluations) or purely focused on physiology or psychopathology.**

A portion of available funding may be made available for (i) meritorious proposals from minority institutions and historically black colleges and universities, and (ii) individuals who are early in their research careers and have never received ARI funding as a Principal Investigator.

The decision to fund a new basic research program consists of two stages. First, two behavioral scientists from RACO review each proposal for responsiveness and technical merit. In addition, proposal abstracts are circulated throughout ARI and behavioral scientists assigned to ARI applied research units are invited to provide additional reviews. Second, ARI research unit chiefs are asked to identify proposals that may transition to their applied research programs. Funding priority will be given to those proposals that are both rated as highly responsive and are identified as having transition potential. Proposals should describe their contribution to theory and how their results may support applied behavioral research that would be meaningful to the Army.

II. Scientific Problems for Basic Research.

To meet the transformation objectives of the U.S. Army over the next two decades, the Army must improve its capability to:

1. Select, classify, train, and develop Soldiers and leaders who:
    a. Adapt quickly to novel missions such as negotiations, operational environments, and a wide spectrum of cultures and languages.

   b. Function effectively in digital, information rich, and semi-autonomous environments
   c. Collaborate effectively in quickly formed teams and in high stress environments
   d. Possess interpersonal and intercultural skills/attributes relevant to joint-service and multi-national operations.
2. Accelerate the development of Soldier leadership, interpersonal, and emotional skills.
3. Support human performance in net-centric operations which increase effectiveness by sharing information in a distributed network of people.

ARI requests proposals to conduct basic research that will provide a scientific foundation to support these broad capabilities.

III. BAA Basic Research Areas of Interest

While all proposals will be considered, ARI has identified the following domains as especially germane to its basic research needs. This list is neither comprehensive nor exclusive and proposals may span domains. These areas include:

a. Network Science.
b. Training and Learning.
c. Leadership.
d. Human Resources.
e. Social Systems.
f. Affect and Emotions.

For additional information proposal developers should consult the National Research Council of the National Academies' report of the Committee on Opportunities in Basic Research in the Behavioral and Social Sciences for the U.S. Military. This report is available from the National Academies Press at 800-624-6242 or 202-334-3313 or on the internet at http://www.nap.edu.

Details describing areas of interest follow:

1. Network Science. These proposals should be focused on cognitive and social domains and be designed to investigate individual, unit, and organizational behavior within the context of complex networked environments.
   a. At the individual level, proposal topics might include:
      i. Effects of technologically-rich, networked, digital environments on leader or team member capabilities and performance.
      ii. Productive utilization of advanced information networks.
      iii. Relationships among neural activity (e.g., MRI & MEG) and cognitive & emotional abilities (e.g., intelligence, pattern recognition & social commitment).
   b. At the unit level, proposal topics might include:
      i. Cognitive and social network processes that lead to collective skill development and team performance.
      ii. Shared mental models that influence understandings of leader intent and team performance.

iii. Cognitive and social factors that facilitate or impair team formation and contribute to trust, especially for distributed or rapidly formed teams.
iv. Understanding the nature of the links among individual team members engaged in a common task or function that make team performance something other than the sum of the performances of individual team members.

c. At the organizational level, proposal topics might include:
i. Organizational concepts within the context of networked environments.
ii. The impact of structural issues such as vertical complexity, autonomy, and self-synchronization.
iii. The impact of information and situational awareness on organizational behavior.
iv. Measuring, understanding, and communicating important properties of social networks and how they interact with information networks.
v. Measuring, understanding, and describing how information networks impact human organizational structure and command and control capabilities.

2. Training and Learning. These proposals may reference all aspects of training design, but should focus on identifying general training principles and training theory refining technologies.
a. To support training for emerging domains, proposal topics might include:
i. Methods designed to structure poorly specified knowledge.
ii. Techniques to elicit knowledge from experts and alternate sources.
iii. Representations of probabilistic relationships and the transmission of this information through reasoning systems.
iv. Methods for increasing the basic level of effective adaptivity.
v. Methods for improving the learning and retention of difficult languages.
vi. Methods for improving the learning and retention of cross cultural negotiations techniques.
vii. Understanding based on objective measurement of how different classes of instruction affect learning and retention at the level of task class where a task class is entirely independent of other such classes.
viii. Understanding the neurophysiologic processes of retention and recall at or below the cellular level.
b. To support intelligent agents and simulations, proposal topics might include:
i. Techniques that automatically evaluate learner performance thereby guiding simulation modifications and providing tailored feedback.
ii. Techniques to provide dialog capability for virtual coaches and synthetic characters. Emphasis is placed on natural language systems that understand the meaning of unconstrained input, perform active reasoning, and generate responses.
c. To investigate the learning of tasks, proposal topics might include:
i. The growth of expertise for complex tasks and methods to accelerate learning, maximize retention and enhance training transfer.
ii. Multi-task training techniques to reduce information overload.

iii. Mentoring and collaborative learning methods in web-based or distributed learning environments.
iv. Identification of principles relevant to understanding the capacity of emerging educational technologies (e.g., video game based tools, dialogue tutors) to support training and learning goals

3. Leadership. These proposals might focus on the following areas.
   a. Basic leaders and follower skills:
      i. Identification, assessment, and modeling of interpersonal skills for Future Force leaders and followers.
      ii. Identification of skills for mentoring and coaching emerging leaders.
   b. Leadership in complex and dynamic environments:
      i. Assessment of leader competencies associated with technologically-advanced systems (e.g., unmanned systems), multi-national teams and multi-cultural/dispersed environments.
      ii. Understand and measure shared intent within team structures.
   c. Leadership Evaluation:
      i. Theory and methods to validate objective measures of leadership.
      ii. Identification of objectively measured verbal and nonverbal leader behaviors that lead to successful unit performance
   d. Leader development:
      i. Methods to accelerate leader development to include assessment and training. May focus on self-development.
      ii. Methods to develop and train flexibility & adaptability in novel situations.
      iii. Executive / Senior leader development.
4. Human Resources. These proposals might address basic research in these areas.
   a. Personnel selection and assignment
      i. Creating theory to develop maximal performance measures to assess constructs traditionally measured using self-report (e.g., temperament).
      ii. Developing theory and techniques to assess and validate variations in traits typically considered stable (e.g., cognitive ability, adaptivity, and second language learning) against relevant criteria.
      iii. Creating theory and techniques to understand relationships among adaptivity/creativity and pattern recognition; uncertainty management and probabilistic reasoning.
      iv. Developing theory and techniques to create unbiased cognitive and non-cognitive individual difference measures.
      v. Developing theory and techniques to assess and validate dynamic skills (e.g., interaction skills, oral/written communication skills, computer literacy).
   b. Personnel Classification.
      i. Developing theory to create criteria across <u>many</u> jobs. Utilizing, introducing and capitalizing on classification potential. Valuing classification gains.
      ii. Developing job analysis theory to assess similarities across many jobs.
      iii. Developing theory and methodology to identify, assess, and validate work competencies.

   c. Understanding the development and relationships among the psychological, demographic, motivational and organizational factors that influence:
      i. Youth enlistment propensity and Soldier recruitment, especially the enlistment propensity and recruitment of high cognitive ability youth.
      ii. Soldier retention.
      iii. Soldier productivity and citizenship.
5. Social Systems. These proposals might address basic research in these areas.
   a. The impact of major societal conditions and trends, changing Army missions, and Army culture influence recruitment, personnel retention, morale, cohesion, discipline, and military performance.
   b. Understanding, measuring and modeling individual differences in cultural awareness.
6. Affect and Emotions. These proposals might address the role of affect in calibrating behavioral actions and cognition. Proposals might include:
   a. Understanding the value and development of human emotions in calibrating psychological and behavioral systems.
   b. Understanding leading to the ability to predict how emotions, as positive and negative evaluative processes, influence actions and cognitions.
   c. Validating measures of affective processes that include functional neuroimaging, changes in brain chemistry along with traditional psychological measures of these constructs.
   d. Understanding how leaders identify, shape, and channel their own emotions and the emotions of their subordinates to impact individual-level and group-level performance.
   e. Understanding how people respond emotionally to information from humans vs. machines (e.g., robots, computers) and how this affects the trust they place in those information sources.
   f. Understanding the neurophysiologic bases of emotion.
   g. Understanding the role of nonverbal cues in communicating emotions

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IV. Time, Personnel, and Other Features of the Research.

ARI will accept both Standard and Early Career Proposals in response to this BAA.

Standard Proposals. Most contracts are awarded in response to Standard Proposals provided by experienced researchers. In recent years, the performance period of these contracts has ranged from one to four years, with a median of three years. In FY07, the median contract award was $589,000, and the awards ranged from $300,000 to $700,000. Standard Proposals may be formulated as either a complete effort, or as a base contract plus option(s) that may be exercised by ARI if initial results are promising.

Early Career Proposals. To foster the development of innovative and creative researchers, ARI is soliciting proposals from individuals who are early in their research careers and have never received ARI funding as a Principal Investigator. All typical ARI evaluation dimensions will be used to evaluate Early Career Proposals, except the dimension that addresses the experience of

the principal investigator (dimensions are described below). In all other respects, the materials in this BAA apply equally to both Standard and Early Career proposals.

To be considered for the Early Career category:

1. Investigators must specify in the Proposal Abstract that they are requesting consideration under this funding category.
2. Projects should be designed for one year of funding, with the possibility of optional research (one to two additional years) should the initial work prove promising.
3. The research must fit into one of the stated BAA Basic Research areas of interest.
4. Investigators should be early in their research careers, i.e. less than five years post-doctorate, and have not previously received funding from ARI as a Principal Investigator.
5. While there is no specific amount of funding set aside for these proposals, initial budgets should be modest: approximately $110K for the initial year.

General Guidelines for All Proposals. Both single-investigator and collaborative research efforts are encouraged. Multidisciplinary approaches are especially encouraged to the extent that the proposal reflects the theories, models, and approaches of multiple disciplines, combined in a creative to address the research problem. Collaborative efforts may involve researchers either at a single institution or in cooperating institutions. Short-term, small-scale efforts in high-risk/high-gain areas are welcome. The use of military participants is not necessary, and moreover, ARI cannot arrange access to military participants to support basic research investigations.

Offerors with questions about the suitability of their planned research may e-mail (preferred) or telephone the BRO program managers at BRO@ari.army.mil. For questions regarding a proposal's potential to transition to an applied unit, the relevant research unit chief(s) may be contacted, and this office will assist in locating the appropriate individual. However, the use of e-mail is optional and is not a secure method of communication, and the government is not responsible for technical difficulties or disclosures resulting from e-mail communications.

V. Application Procedures.

Proposals are to be e-mailed to LaWanda.Stewart@hqda.army.mil of the Contracting Center of Excellence (CCE) in electronic MS Word format. For proposals that are eventually funded, two signed hardcopies must be supplied at CCE's request. If the electronic version includes a signature from the appropriate representative of the university or company, hard copies will not be needed. The MS Word file document must include the complete technical and financial sections of the proposal.

All proposals must include:

1. An Abstract, Background, Technical Approach, References, Resumes of proposed researchers, and Budget, as described below.
2. Contact information such as e-mail addresses and telephone numbers to allow technical and contracting questions to be addressed;

3. Institutional endorsement, signature of the proposed principal investigator, time frames for all phases of the project, and detailed accounts of proposed work and budget.

The Abstract, Background, and Technical Approach sections of the proposals should be no greater than 21 pages in length. All pages should be single-spaced, have one-inch margins, and utilize a typeface no smaller than Times New Roman 12 font. Proposals should be very well-written, and author intention should be clear to technical reviewers who, while having expertise in behavioral sciences, may lack concentrated knowledge in the proposed domain. Proposals should be sufficiently detailed to be responsive to the criteria, described below, for evaluation. Additional materials may include vitae, references, and institutional information.

Scientific peers will review the proposals according to the following dimensions in order of importance:

1. Importance of the research to ARI's mission and Army concerns.
2. Merit of the proposed technical approach.
3. Originality of the proposed research and its potential effect on the field.
4. The qualifications, capabilities, and experience of the proposed principal investigator and key personnel, and institutional resources and facilities. This dimension will not be rated for Early Career proposals.
5. Realism, affordability, and appropriateness of proposed costs

Each dimension, as well as the overall proposal, will be given a letter grade between A+ and F.

A-Outstanding, of the highest quality
B-Good, but could be improved
C-Average
D-Below average
F-Totally inadequate and without merit

All proposals should contain the following sections:

- *Abstract*. The abstract should be 150 words or less. Abstracts longer than 150 words will not be read. It should summarize the proposed research objectives, expectations, and approach. The abstract must identify implications for applied research if the project is successful.

- *Background*. The background should describe the research problem, discuss relevant theory, and summarize existing research. It is important that the proposal identify specific, relevant hypotheses following discussion of theory. The research proposal should describe how possible results may support applied research that would be meaningful to the Army. Authors should reference the most relevant sections of the BAA and link these sections to the proposed effort. Authors may incorporate a separate section titled *Army Relevance* to highlight these connections.

- *Technical Approach*. The technical approach should follow and expand upon the background section and provide a detailed description of the proposed method. This account should be much like the methods section of a research paper. It should include a description of the data to be collected, the methods for collecting the data, the number and source of subjects and how they will be acquired, the research design, and likely analysis methods. It is possible that an intermediate or final product of research will include training packages, simulation models, or other software-based devices. In this case, the proposal should relate the product to the research hypotheses and provide sufficient detail to permit understanding and evaluation. The technical approach should detail the major tasks to be performed and products to be produced. In the case of a one-year proposal, the statement should be divided by quarters of the year. In the case of multi-year proposals, it should be divided by year. The combined length of the *Background* and *Technical Approach* sections should be no longer than 20 pages.

- *Reference List*. All cited references should be listed. Do not include publications that are not referenced. The references list must be in American Psychological Association format, APA 5th Edition.

- *Résumés*. Résumés or curriculum vitae should be included for all proposed researchers with special emphasis on the Principal Investigator(s).

- *Budget*. The budget must estimate the total cost broken down by government fiscal year (the government fiscal years run from October 1 through the following September 30), the number of person hours per government fiscal year and the total amount for the life of the program broken out by personnel type: senior scientist/full, associate, or assistant professor, post doc. or research associate, graduate student, undergraduate student, I.T. personnel, administrative personnel, etc., and the fully loaded rate per hour for each such category (fully loaded means these rates must include all fringe benefits and all other overhead), and described miscellaneous expenses. Proposers, who are not in the Washington, DC area, should budget at least one trip per year to ARI in Arlington, VA to present the progress of their research. Proposers, who are in the Washington, DC area, should budget this trip to Kansas City, Missouri. The budget should justify major expense categories.

VI. *Concept Papers*. While *Concept Papers* are optional, ARI invites potential offerors who would like an early indication of the suitability of their topics to submit *Concept Papers* by e-mail (preferred) to BRO@ari.army.mil or by post to the below address**.** If submitted, Concept Papers must be in the form of an MS Word Document, five single-spaced pages or less, addressing the proposed research, and should estimate the total budget. Please enclose an e-mail address and a telephone number where you can be reached. Please submit concept papers **at least 6 weeks before** the deadline for proposals. Concept papers submitted later than this date may not receive a timely response.

VII. Deadlines. To be considered for funding, electronic versions of the formal proposals (in for form of a single MS Word Doc file) must be received at ARI by e-mail no later than **3:30 P.M. EST 15 May 2008** Electronic versions of the technical and cost proposals must be combined

into one MS Word Document file. This file must be e-mailed to LaWanda.Stewart@hqda.army.mil. Following the evaluation process, authors of those proposals that have been selected for award will be informed. At that time, a signed original and one copy of the complete proposal (technical and cost) should be FEDEXed to ARI at the postal address.

Awards will be made between October 1, 2008 and September 30, 2009.

VIII. Inquiries. Correspondence, inquiries, and concept papers may be sent to BRO@ari.army.mil or by mail to the postal address below.

IX. Postal Address.

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2511 Jefferson Davis Highway
Arlington, VA 22202-3926

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703-602-7931